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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/646,264 | 08/22/2003 | Bradley R. Johnson | 50005-114 | 9466 |

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| EXAMINER |
|---|
| TUROCY, DAVID P |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1762 | |

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/646,264 | JOHNSON ET AL. | |
| | Examiner | Art Unit | |
| | David Turocy | 1762 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *26 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) *23-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19,38-40 and 44* is/are rejected.

7)☒ Claim(s) *20-22,41-43 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 23-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 9/26/2005.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6159831 by Thrush et al. hereafter Thrush.

Thrush teaches a method of forming chalcogenide nanowires by condensing a chalcogenide vapor to form a nanowire of a chalcogenide on a preselect portion of the base (Column 1, line 65 – Column 2, line 11, Column 6, lines 1-10).

4. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by D'yakonenko et al., hereafter D'yakonenko.

D'yakonenko teaches a method of forming amorphous film of chalcogenide compounds on a substrate by condensing a vapor phase chalcogenide to form an amorphous nanostructure on the substrate (abstract). D'yakonenko teaches of providing arsenic and chalcogenide within the ratio range as claimed (paragraph 2).

5. Claims 39, 40, and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5310669 by Richmond et al, hereafter Richmond.

Richmond discloses a method of forming a microstructure on an implant by subliming a material to provide a vapor and deposit the vapor on the implant (Column 3, lines 15-30).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 6-13, 15-17, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thrush in view of US Patent 528295 by Winter et al, hereafter Winter.

Thrush teaches all the limitations of these claims as discussed above in the 35 USC 102(b) rejection, however, Thrush fails to disclose vaporizing bulk chalcogenide.

However, Winter, teaches forming a solid single source chalcogenide and heating the precursor to sublime the chalcogenide solid to produce a vapor for formation of a chalcogenide film (abstract, figures). Winter discloses providing a pressure less than atmospheric for the process where the vapor and the substrate are in fluid communication (abstract, figure). Winter discloses subliming the correct stoichiometry of the desired coating in order to reduce waste materials (Column 1, lines 40-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Thrush to use the continuous sublimation of a single source chalcogenide as suggested by Winter to provide a desirable chalcogenide vapor for formation of nanowires because Winter discloses subliming the solid precursor in the appropriate stoichiometry to minimize waste is known in the art to provide vapors for

depositing a chalcogenide and therefore would reasonably be expected to effectively provide chalcogenide vapors for formation of nanowires.

Thrush in view of Winter fails to disclose the claimed temperatures for the process. However, it is the examiners position that the process parameters of temperature is a known result effective variable in the art. If temperature were low or too high it would result in improper film formation.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the temperatures used in the process of Thrush in view of Winter, through routine experimentation, to effectively provide nanowires comprising chalcogenide glass with the desired characteristics.

Claim 15: Thrush discloses forming nanowires within the range as claimed (Column 2, lines 20-25).

Claim 16: Thrush discloses forming condensing the chalcogenide onto a previously deposited chalcogenide and therefore the preselected portion of the substrate would therefore be substantially amorphous (Column 2, lines 1-11).

Claims 2-5 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thrush in view of Winter and further in view of the admitted state of the art as taught by the applicants description.

Thrush in view of Winter teaches of forming nanowires of a semiconductor material, such as a chalcogenide material, but fails to explicitly disclose forming nanowires of a semiconductor material comprising arsenic and sulfur in the ratio as claimed.

However, the admitted state of the art discloses semiconductor materials include many chalcogenide glasses, such as As-S, As-Se, As-S-Se, etc. and such materials are useful in a variety of applications (Pages 1-2). In addition the admitted state of the art discloses including a rare earth dopant in a semiconductor material is known in the art (Pages 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Thrush in view of Winter to use the semiconductor materials as suggested by the admitted state of the art to provide a desirable nanowires because Thrush in view of Winter discloses forming nanowires from a variety of semiconductor materials and the admitted state of the art discloses known and useful semiconductor materials and one would therefore reasonably be expected to effectively provide an As-S nanowires using the process as taught by Thrush in view of Winter.

Claim 5: The examiner notes the range of dopant material is inclusive of zero mole percent dopant.

***Allowable Subject Matter***

9. Claims 20-22, 40-43 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art cited or reviewed by the examiner alone or in combination teaches or reasonably suggests providing the chalcogenide nanowires as claimed on the substrates as claimed

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Inorganic Nanotubes, by Rao et al. and Stability of Metal Chalcogenide Nanotube by Seifert et al. are cited here to show the current state of the art regarding the formation of metal - chalcogenide nanotubes. In addition the examiner cites "Chalcogen" to demonstrate the definition used by the examiner for the purposes of applying art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
AU 1762

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER